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10/696,472	10/29/2003	Changick Kim	AP174HO	6963

	EXAMINER
20178 7590 03/12/2007 EPSON RESEARCH AND DEVELOPMENT INC INTELLECTUAL PROPERTY DEPT 2580 ORCHARD PARKWAY, SUITE 225 SAN JOSE, CA 95131	TORRES, JOSE

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SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE _3_ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on _23 January 2007_.

2a)☐ This action is **FINAL**.   2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) _1-37 and 39-42_ is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _1-37 and 39-42_ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on _23 January 2007_ is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____.

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1.   The amendment filed on January 23, 2007 have been entered and made of

record.

Claim Rejections - 35 USC § 103

2.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3.   Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Challapali et al. (US 6,298,090) in view of Bi et al. (US 6,724,822).

Challapali et al. teaches a method for scaling video data, comprising: determining

whether a block of image data of a current frame is flagged to indicate a level of

difference with a corresponding block of a previous frame (FIG. 2, "film mode detection

circuit", Col. 4 line 56 through Col. 5 line 4).

As to claim 11, Challapali et al. fails to disclose if the block of image data of the

current frame is flagged to indicate a level of difference with a corresponding block of

image data of the previous frame, then the method includes; applying a weighted

interpolation scheme adaptively to each pixel location within the block of image data of

the current frame based upon a direction associated with the pixel location and the level

of difference between the current frame and the previous frame; and upscaling the block

of image data.

Bi et al. teaches if the block of image data of the current frame is flagged to

indicate a level of difference with a corresponding block of image data of the previous

frame, then the method includes; applying a weighted interpolation scheme (FIG. 4,

"interpolation section **220**") adaptively to each pixel location within the block of image

data of the current frame based upon a direction associated with the pixel location and

the level of difference between the current frame and the previous frame ("interpolation

based on orthogonal transform by vectors, which contain direction, and weight

coefficients, and based on difference between data sets, where video is composed of

successive frames", Col. 3 lines 1-23, Col. 4 lines 12-20, and Col. 5 lines 32-55); and

upscaling the block of image data (FIG. 12a, "Up-sampled pixels", Col. 6 lines 44-65).

Therefore, in view of Bi et al., it would have been obvious to one of ordinary skill

in the art at the time the invention was made to modify Challapali et al.'s method by

incorporating the method steps of applying a weighted interpolation scheme to each

pixel location based on the direction of a vector and the level of difference between the

frames in order to implement the method with less computational operations (Col. 2

lines 5-13).

As to claim 12, Challapali et al. further teaches if the block of image data of a

current frame is flagged to indicate a level of redundancy with the corresponding block

of image data of the previous frame, then the method includes; copying upscaled data

representing the corresponding block of image data of the previous frame into an

upscaled block of image data of the current frame (Col. 5 lines 10-15).

4.   Claims 13-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Challapali et al. in view of Bi et al. as applied to claim 11 above, and further in view of

Silver et al. (US 6,408,109). The teachings of Challapali et al. as modified by Bi et al.

have been discussed above.

As to claim 13, Challapali et al. as modified by Bi et al. fails to disclose

determining whether a direction associated with a pixel is a horizontal direction or a

vertical direction.

Silver et al. teaches determining whether a direction associated with a pixel is a

horizontal direction or a vertical direction (FIG. 3A, Col. 11 line 51 through Col. 12 line

45).

Therefore, in view of Silver et al., it would have been obvious to one of ordinary

skill in the art at the time the invention was made to further modify Challapali et al. and

Bi et al. by incorporating the method step of determining whether a direction associated

with a pixel is a horizontal direction or a vertical direction in order to determine accurate

subpixel positions of the edges detected (Col. 2 lines 53-61).

As to claim 14, Silver et al. further teaches identifying a gradient value associated

with the pixel; defining a horizontal component of the gradient value ("G_X"); defining a

vertical component of the gradient value ("G_Y"); and calculating a magnitude of the

gradient value ("G$_O$") from the horizontal component and the vertical component (FIG. 2A, Col. 7 lines 38-49).

As to claim 15, Challapali et al. as modified by Bi et al. fails to disclose transforming coordinates representing a particular pixel location through a function associated with a sigmoidal shape.

Silver et al. teaches transforming coordinates representing a particular pixel location through a function associated with a sigmoidal shape (FIG. 5, Col. 15 lines 51-55).

Therefore, in view of Silver et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Challapali et al. and Bi et al. by incorporating the method step of transforming coordinates representing a particular pixel location through a function associated with a sigmoidal shape in order to obtain a simple, inexpensive and flexible interpolation method (Col. 16 lines 31-43).

5.   Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Challapali et al. in view of Bi et al. further in view of Silver et al. as applied to claim 14 above, and further in view of Hsu et al. (US 5,991,464). The teachings of Challapali et al. as modified by Bi et al. and Silver et al. have been discussed above.

Silver et al. further teaches comparing the magnitude of the gradient value to a threshold value ("noise threshold", Col. 13 lines 35-53).

Hsu et al. teaches computing a direction angle associated with each pixel location upon both the horizontal component and the vertical component ("orientation angle A", Col. 7 lines 6-39); and applying a bilinear interpolation scheme or a bicubic interpolation scheme to a value corresponding to the pixel location ("non-oriented classification" Col. 5 lines 8-19).

Therefore, in view of Hsu et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Challapali et al., Bi et al. and Silver et al., by incorporating the method steps of computing an orientation angle associated with each pixel location based upon both the horizontal and vertical component and applying a bilinear interpolation scheme to the value corresponding to the pixel location in the event that the value fails to exceed a threshold level in order to provide a system for enhancing the resolution of an image which facilitates quick and efficient image expansions (Col. 2 lines 44-47 and Col. 7 line 64 throuhg Col. 9 line 10).

6.   Claims 17-20 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Silver et al. in view of Hsu et al.

Silver et al. teaches a computer readable medium having program instructions for upscaling image data, comprising: program instructions for identifying a gradient value associated with pixel location of the image data (Col. 6 lines 1-40); program instructions for determining whether a direction associated with the pixel location is a horizontal direction or a vertical direction (FIG. 3A, Col. 11 line 51 through Col. 12 line 45).

As to claim 17, Silver et al. fails to disclose program instructions for applying a weighted interpolation scheme to the pixel location to upscale the image data when the direction is a horizontal direction or a vertical direction.

Hsu et al. teaches program instructions for applying a weighted interpolation scheme to the pixel location to upscale ("image expansions" Col. 2 lines 44-47) the image data when the direction is a horizontal direction or a vertical direction (FIG. 1, "adaptive interpolation module 300" and "oriented classification", Col. 5 lines 8-19 and Col. 12 lines 14-33).

Therefore, in view of Hsu et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Silver et al.'s system by incorporating program instructions for applying a weighted interpolation scheme to the pixel location to upscale the image data when the direction is a horizontal direction or a vertical direction in order to enhance the resolution of the image, while preserving the image fidelity (Col. 2 lines 31-34).

As to claim 18, Silver et al. fails to disclose program instructions for applying a bilinear interpolation scheme or a bicubic interpolation scheme to the pixel location when the direction is a non-horizontal direction or a non-vertical direction.

Hsu et al. teaches program instructions for applying a bilinear interpolation scheme or a bicubic interpolation scheme to the pixel location when the direction is a non-horizontal direction or a non-vertical direction (FIG. 1, "bilinear interpolation module 200" and "non-oriented classification", Col. 5 lines 8-19).

Therefore, in view of Hsu et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Silver et al.'s system by incorporating program instructions for applying a bilinear interpolation scheme or a bicubic interpolation scheme to the pixel location when the direction is a non-horizontal direction or a non-vertical direction in order to enhance the resolution of the image in a computationally-efficient manner (Col. 2 lines 41-43).

As to claim 19, Silver et al. further teaches program instructions for determining a partial derivative associated with the pixel location (Col. 6 lines 24-27).

As to claim 20, Silver et al. further teaches program instructions for defining a horizontal component of the gradient value ("G_X"); program instructions for defining a vertical component of the gradient value ("G_Y"); and program instructions for calculating a magnitude of the gradient value ("G_O") from the horizontal component and the vertical component (FIG. 2A, Col. 7 lines 38-49).

As to claim 22, Silver et al. further teaches program instructions for transforming coordinates representing the pixel location through a function having a sigmoidal shape (FIG. 5, Col. 15 lines 51-55).

7.   Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Silver et al. in view Hsu et al. as applied to claim 20 above, and further in view of Hibbar (US

5,382,976). The teachings of Silver et al. modified by Hsu et al. have been discussed above.

Silver et al. further teaches program instructions for computing a direction angle associated with the pixel location based upon both the horizontal component and the vertical component; and program instructions for comparing the magnitude of the gradient value to a threshold value.

However, Silver et al. fails to disclose program instructions for applying a bilinear interpolation scheme or a bicubic interpolation scheme to the pixel location when the magnitude of the gradient value exceeds the threshold value.

Hibbar teaches program instructions for applying a bilinear interpolation scheme or a bicubic interpolation scheme to the pixel location when the magnitude of the gradient value exceeds the threshold value (Col. 4 line 61 through Col. 5 line 17 and Col. 7 lines 6-8).

Therefore, in view of Hibbar, it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Silver et al. and Hsu et al. by incorporating the program instructions for applying a bilinear interpolation scheme or a bicubic interpolation scheme to the pixel location when the magnitude of the gradient value exceeds the threshold value in order to reduce color artifacts without adding undue complexity to the processing (Col. 2 lines 35-37).

8.   Claims 27-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Challapali et al. in view of Hsu et al.

Challapali et al. teaches a system for processing block based image data, comprising: an encoder (FIG. 1 "encoder 4") configured to compress video data, the encoder configured to set a coded block indicator to a first value ("1") when inter frame redundancies between corresponding blocks of successive frames of a video stream exceed a threshold value, the encoder further configured to set the coded block indicator to a second value ("0") when the inter frame redundancies between successive frames of a video stream are less than or equal to the threshold value (Col. 5 lines 18-30 and line 57 through Col. 6 line 6) ; a decoder configured to decompress the video data (FIG. 1 "decoder 5", Col. 5 lines 5-18) .

As to claim 27, Challapali et al. fails to disclose a scaling module configured to scale the decompressed video data, the scaling module including circuitry for identifying the coded block indicator for each block, the scaling module further including circuitry for adaptively applying a weighted interpolation scheme to a pixel location within a current frame when the coded block indicator is equal to the first value.

Hsu et al. teaches a scaling module configured to scale the decompressed video data (FIG. 1, "adaptive video image resolution enhancement system 1"), the scaling module including circuitry for identifying the coded block indicator ("oriented or non-oriented") for each block, the scaling module further including circuitry for adaptively applying a weighted interpolation scheme ("adaptive interpolation") to a pixel location within a current frame when the coded block indicator is equal to the first value (Col. 4 lines 30-41, Col. 8 lines 42-63, and Col. 12 lines 14-33).

Therefore, in view of Hsu et al., it would have been obvious to one of ordinary

skill in the art at the time the invention was made to modify Challapali et al.'s system by

incorporating the adaptive video image resolution enhancement system to scale or

change the resolution of the image, read an indicator identifying the current and

interpolating the image block using a weighted interpolation scheme if the indicator is

equal to certain value in order to enhance the resolution of the image in a simple,

computationally-efficient manner (Col. 2 lines 41-47).

As to claim 28, Challapali et al. further teaches the threshold value represents a

summation of differences between corresponding pixel values of the successive frames

of the video stream (Col. 2 lines 26-46).

As to claim 29, Challapali et al. further teaches circuitry for copying a block

corresponding to the pixel location from a previous frame when the coded block

indicator is equal to the second value (Col. 5 lines 5-17).

9.   Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over

Challapali et al. in view of Hsu et al. as applied to claim 27 above, and further in view of

Trenary et al. (US 6,970,179). The teachings of Challapali et al. as modified by Hsu et

al. have been discussed above.

As to claim 30, Challapali et al. as modified by Hsu et al. fails to disclose the

scaling module is incorporated into the decoder.

Trenary et al. teaches the scaling module is incorporated into the decoder (FIGs. 5-6b, Col. 7 lines 38-45 and Col. 8 lines 5-16).

Therefore, in view of Trenary et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Challapali et al. and Hsu et al. by incorporating the scaling module into the decoder as taught by Trenary et al. in order to provide a faster method of scaling up image data (Col. 8 lines 5-16).

10.   Claims 31 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Challapali et al. in view of Hsu et al. as applied to claim 27 above, and further in view of Silver et al. The teachings of Challapali et al. as modified by Hsu et al. have been discussed above.

As to claim 31, Challpali et al. as modified by Hsu et al. fails to disclose circuitry for determining whether a direction associated with a gradient corresponding to the pixel location is a horizontal direction or a vertical direction.

Silver et al. teaches circuitry for determining whether a direction associated with a gradient corresponding to the pixel location is a horizontal direction or a vertical direction (FIG. 3A, Col. 11 line 51 through Col. 12 line 45).

Therefore, in view of Silver et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Challapali et al. and Hsu et al. by incorporating circuitry for determining whether a direction associated with a gradient corresponding to the pixel location is a horizontal direction or a vertical

direction in order to determine accurate subpixel positions of the edges detected (Col. 2

lines 53-61).

As to claim 32, Challapali et al. as modified by Hsu et al. fails to disclose circuitry

for calculating a magnitude of the gradient from both a horizontal component of the

gradient and a vertical component of the gradient.

Silver et al. further teaches circuitry for calculating a magnitude of the gradient

("G_O") from both a horizontal component of the gradient ("G_X") and a vertical component

of the gradient ("G_Y", Col. 7 lines 38-49).

11.   Claims 39 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Challapali et al. in view of Hsu et al.

Challapali et al. teaches an integrated circuit capable of scaling video data,

comprising: logic for determining whether a block of image data of a current frame is

flagged to indicate a level of difference with a corresponding block of image data of a

previous frame (FIG. 2, "film mode detection circuit", Col. 4 line 56 through Col. 5 line

4).

As to claim 39, Challapali et al. fails to disclose logic for applying a weighted

interpolation scheme adaptively to a pixel location within the block of image data of the

current frame based upon a direction associated with the pixel location, wherein the

block of image data of the current frame is associated with a flag indicative of a level of

difference with the corresponding block of image data of the previous frame; and logic

for applying a bilinear interpolation scheme when the direction associated with the pixel

location excludes the weighted interpolation scheme.

Hsu et al. teaches logic for applying a weighted interpolation scheme adaptively

to a pixel location within the block of image data of the current frame based upon a

direction associated with the pixel location ("oriented classification", Col. 5 lines 8-19

and "weighting factor set matrix C" Col. 12 lines 14-33), wherein the block of image data

of the current frame is associated with a flag indicative of a level of difference with the

corresponding block of image data of the previous frame; and logic for applying a

bilinear interpolation scheme when the direction associated with the pixel location

excludes the weighted interpolation scheme ("non-oriented classification" Col. 5 lines 8-

19).

Therefore, in view of Hsu et al., it would have been obvious to one of ordinary

skill in the art at the time the invention was made to modify Challapali et al.'s system by

incorporating the logic for applying a weighted interpolation scheme adaptively to a pixel

location within the block of image data of the current frame based upon a direction

associated with the pixel location and logic for applying a bilinear interpolation scheme

when the direction associated with the pixel location excludes the weighted interpolation

scheme in order to provide a system for enhancing the resolution of an image which

facilitates quick and efficient image expansions (Col. 2 lines 44-47).

As to claim 42, Challapali further teaches logic for detecting the flag (FIG. 2,

"coding circuitry **15**", Col. 5 lines 57 through Col. 6 line 6).

12.   Claims 40 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable

over Challapali et al. in view of Hsu et al. as applied to claim 39 above, and further in

view of Silver et al. The teachings of Challapali et al. as modified by Hsu et al. have

been discussed above.

As to claim 40, Challpali et al. as modified by Hsu et al. fails to disclose logic for

transforming coordinates representing a particular pixel location through a function

associated with a sigmoidal shape.

Silver et al. teaches logic for transforming coordinates representing a particular

pixel location through a function associated with a sigmoidal shape (FIG. 5, Col. 15 lines

51-55).

Therefore, in view of Silver et al., it would have been obvious to one of ordinary

skill in the art at the time the invention was made to further modify Challapali et al. and

Hsu et al. by incorporating the logic for transforming coordinates representing a

particular pixel location through a function associated with a sigmoidal shape in order to

obtain a simple, inexpensive and flexible interpolation method (Col. 16 lines 31-43).

As to claim 41, Challapali et al. as modified by Hsu et al. fails to disclose logic for

determining whether a direction associated with a pixel in a horizontal direction or a

vertical direction.

Silver et al. further teaches logic for determining whether a direction associated with a pixel in a horizontal direction or a vertical direction (FIG. 3A, Col. 11 line 51 through Col. 12 line 45).

Therefore, in view of Silver et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to further modify Challapali et al. and Hsu et al. by incorporating the logic for determining whether a direction associated with a pixel in a horizontal direction or a vertical direction in order to determine accurate subpixel positions of the edges detected (Col. 2 lines 53-61).

Response to Arguments

13.   The amendment filed on January 23, 2007 have been entered and made of record.

Objections to the Drawings

14.   The Drawings have been amended to correct points y_3 and y_4, to correspond to a clockwise position. Therefore, the objection has been removed.

The specification has been amended to include "exemplary image 120" shown in Figure 5. Therefore, the objection has been removed.

The specification has been amended to correct "operation 136" shown in Figure 9. Therefore, the objection has been removed.

Objections to the Specification

15.   The specification has been amended to include "It should be appreciated that the horizontal variable direction (x) of equation 10 Is held constant, while the vertical variable direction (y) of equation 11 is held constant" as to correct proper antecedent basis for the claimed subject matter. Therefore, the objection has been removed.

Claim Rejections under 35 U.S.C. 101

16.   With respect to the 35 U.S.C. 101 rejections on claims 17-26, applicant has amended the specification to delete "The computer readable medium also includes an electromagnetic carrier wave in which the computer code is embodied" as to correct the statutory category of the invention. Therefore, the rejection has been removed.

17.   With respect to the 35 U.S.C. 101 rejections on claims 38 and 43, applicant has cancelled the claims. Therefore, the rejection has been removed.

Claim Rejections under 35 U.S.C. 112

18.   With respect to the 35 U.S.C. 112, second paragraph, rejections on claims 38 and 43, applicant has cancelled the claims. Therefore, the rejection has been removed.

Claim Rejections under 35 U.S.C. 102

19.   With respect to the 35 U.S.C. 102(b) rejections on claims 1, 3, 4, 9, 10, 17, 19,

20, 22, 33, 35, and 36, applicant's arguments have been fully considered, but they are

not persuasive for the following reasons:

        With respect to claim 1 applicant alleges that nowhere in the reference (Silver et

al.) is disclosed the feature of "applying a weighted interpolation scheme to a value

corresponding to the pixel location when the direction is a horizontal direction or a

vertical direction" as stated in page 15, under the Rejections under 35 U.S.C. § 102

Section, lines 27-29. Also, applicant alleges that nowhere in the reference is mentioned

the "identifying a vertical or horizontal direction" as stated in page 16 line 2. The

Examiner disapproves. Silver teaches identifying a gradient value associated with a

pixel location of the image data ("gradient estimation" Col. 6 lines 1-40); determining

whether the direction associated with the pixel location is a horizontal direction or a

vertical direction (FIG. 3A, Col. 11 line 51 through Col. 12 line 45); and applying a

weighted interpolation scheme to a value corresponding to the pixel location when the

direction is a horizontal direction or a vertical direction ("interpolation curve", Col. 16

lines 13-65). Firstly, as for the "applying a weighted interpolation scheme" feature, the

Examiner refers to Cols. 15 and 16 where an interpolation method is disclosed with the

implementation of a "bias parameter b", which form Table 3 and FIG. 5 can be seen that

the interpolation value changes along the location of the edge within a range of ± 0.5.

Since this bias parameter b can be assigned any value above -1, the interpolation value

changes as a function of b, therefore different weights can be obtain as a function of b,

meeting in this case a weighted interpolation scheme. Finally, as for the "identifying a vertical or horizontal direction" feature, Silver discloses this feature as can be seen in FIG. 3A that horizontal and vertical directions are identified as a tile profile, for example G_W, G_O, and G_E all lie along a horizontal direction and G_N, G_O, and G_S all lie along a vertical direction, therefore an identification of a vertical or a horizontal direction feature is disclosed within the reference. Therefore, the rejection is maintained.

Applicant arguments with respect to claims 3, 4, 9 and 10 are no different from those presented for the claim they depend upon. The argument's response for those dependant claims are the same as those presented for claim 1 above. Therefore, the rejections are maintained.

Applicant's arguments with respect to claims 17, 19, 20 and 22 have been considered but are moot in view of the new ground(s) of rejection.

With respect to claim 33, applicant's arguments have been fully considered, but they are not persuasive. Applicant alleges that the feature of "logic for applying a weighted interpolation scheme to the pixel location when a) the direction is both a horizontal direction or a vertical direction and b) the gradient value exceeds a threshold value" as stated in page 16 lines 26-28, is claimed in claim 33. However, the logic for applying a weighted interpolation scheme to the pixel location is done when the direction is a horizontal or a vertical direction, since the word both was deleted in the

preliminary amendment filed on October 28, 2004 and made of record. Silver et al.

teaches applying a curve fitting interpolation mode using a bias parameter b that would

give different weights to the interpolated position ("interpolation curve", Col. 16 lines 13-

65) as explained for claim 1 above, and using a noise threshold to identify edges in the

images, wherein if the gradient magnitude value exceeds this threshold, an edge is

identified, further processing is done, and the edges are subject to the interpolation

method (Col. 13 lines 42-65). Therefore, the rejection is maintained.

With respect to claims 35 and 36, applicant's arguments are no different from

those presented for the claim they depend upon. The argument's response for those

claims are the same as those presented for claim 33 above. Therefore, the rejections

are maintained.

Claim Rejections under 35 U.S.C. 103

20.   With respect to claims 2, 5-8, 34 and 37, applicant's arguments are no different

from those presented for the claims they depend upon in page 20 lines 6-10. The

argument's response is the same as those presented for claims 1, 33 and 36 above.

Therefore, the rejections are maintained.

21.   Applicant's arguments with respect to claims 11-16 have been considered but are

moot in view of the new ground(s) of rejection.

22.   With respect to claims 18 and 21, applicant's arguments have been fully

considered but are moot in view of the new ground(s) of rejection.

23.   With respect to the 35 U.S.C. 103(a) rejections on claims 23-26 applicant's

arguments have been fully considered but they are not persuasive for the following

reasons:

        Applicant alleges that Silver et al. does not apply a weighted interpolation

scheme adaptively based on the direction and the level of difference between frames,

as stated in page 17 lines 23-25 and page 18 lines 20-21. The Examiner disapproves,

since the feature as claimed in claim 23 is based upon a direction only, since the block

has been already flagged from the previous step, therefore the weighted interpolation

scheme applied to the current block would be based upon the direction associated with

the pixel location as taught by Silver et al. ("interpolation curve", Col. 16 lines 13-65),

and as explained for claim 1 above. Therefore, in view of Silver et al., it would have

been obvious to one of ordinary skill in the art at the time the invention was made to

modify Challapli et al. by incorporating the program instructions for applying a weighted

interpolation scheme based upon a direction in order not to only smooth the image, but

to detect edges accurately in the images based on fast and inexpensive estimates of

image gradient magnitude and direction (Col. 2 lines 53-61). The rejections is

maintained.

With respect to claims 24-26 applicant's arguments are no different from those presented for the claims they depend upon. The argument's response is the same as those presented for claim 23 above. Therefore the rejections are maintained.

24.   Applicant's arguments with respect to claims 39-42 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

25.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yamashita et al. disclose an Interpolation Method and Apparatus by Correlation Detection Using Fuzzy Interference, Hsu et al. disclose a Motion-Adaptive De-Interlacing Method and System for Digital Televisions and Mitchell et al. disclose a Method and Apparatus for the Scaling Down of Data.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jose M. Torres whose telephone number is 571-270-1356. The examiner can normally be reached on Monday thru Friday: 8:00am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jingge Wu can be reached on 571-272-7429. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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JMT
03/07/2007

SAMIR AHMED
PRIMARY EXAMINER